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BEHAVIORAL PHARMACOLOGY IN THE ERA OF NEUROSCIENCE

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This special issue of the *Journal of the Experimental Analysis of Behavior* is devoted entirely to research in behavioral pharmacology. *JEAB* has published articles on the behavioral effects of drugs from its inception in 1958 and, in many respects, the journal and the discipline of behavioral pharmacology have developed simultaneously. Both *JEAB* and behavioral pharmacology have their fundamental origins in the experimental analysis of behavior, with many of the same individuals who embarked on the study of operant behavior also making substantial early contributions to behavioral pharmacological research. The first volume of *JEAB* contained articles on both nonhuman and human experiments involving drugs, a tradition that continues to the present and is represented in this issue. The excitement of discovering and manipulating variables that controlled behavior, together with the concomitant use of drugs to "see what happened" under unique behavioral conditions, was evident in the early issues of *JEAB* and in many of the publications that accompanied the beginning phases of this field (see *Annals of the New York Academy of Sciences,* 1956). Novel schedule conditions yielded interesting behavioral procedures, and any time a drug was administered a novel effect was discovered. The excitement of this early approach and the vigor surrounding the development of a new discipline in both the United States and Europe are captured in the articles by Brady, Blackman, and Richelle that are included in this issue.

Tremendous pharmacological advances have occurred during the nearly 35 years since behavioral pharmacology and *JEAB* began. In the same decade as the founding of *JEAB,* chlorpromazine was discovered and was used effectively in the treatment of psychotic disorders. Chlordiazepoxide and imipramine were also introduced during the 1950s as drugs useful in the treatment of anxiety and depressive disorders, respectively. For the most part, however, the dominant focus in early behavioral pharmacology was on amphetamine and pentobarbital, drugs that were shown to have extraordinarily interesting effects on schedule-controlled behavior (e.g., Dews, 1955, 1958; Herrnstein & Morse, 1956). The finding that the schedule of reinforcement could so profoundly influence the behavioral effects of a drug was an important development and continues to this day to be an inspirational testimony to the powerful influence of behavioral variables in determining the effects of drugs. Procedures developed during the early period of behavioral pharmacology continue to be used widely to analyze the behavioral effects of drugs. One procedure in particular, that of behavior suppressed by punishment (Geller & Seifter, 1960), has been very influential in behavioral and pharmacological assays for drugs effective in the treatment of anxiety; the early work in this area by Geller and his colleagues has been acknowledged as a citation classic (Geller, 1990).

The field of behavioral pharmacology has continued to expand over the past 35 years. An index of this growth was observed in 1986 with the founding of the European Behavioural Pharmacology Society and, in 1989, by the founding of *Behavioural Pharmacology,* the first journal devoted specifically to research in this area (Stolerman & Colpaert, 1990). This international focus is reflected also by the editors for this special issue. The Behavioral Pharmacology Society in the United States also has continued to increase in size during the nearly 35 years since its inception. This stamina, after almost four decades of work, and in the face of alternative growth stemming from newly emerging and/or well-established disciplines such as neuroscience, must be viewed as a testimony to the contributions of basic behavioral pharmacological research, to the solidity of its fundamental tenets, and to the promise of sustained activity in the future. Current research stands on a firm foundation of pioneering work that was set in motion during the 1950s and continues to provide the guidance and structure for the efforts reflected in this special issue. Often, it is easy to overlook or neglect the pervasive influence of that work or the challenges that confronted the new field.

Much of that work was done in the midst of the vast theoretical superstructure that was the product of cumbersome psychological theory. Because drugs have no particular allegiance to any theory, it was possible to address impartially many of the issues, such as motivation and emotion, that then surrounded psychological research. It is apparent that much of the theory that dominated behavioral work in the 1950s is no longer of current interest. However, experimental studies of behavior and of the behavioral effects of drugs remain a viable endeavor with sustained academic and industrial activity; importantly, the research continues to be cumulative and, as Dews has said, "with a spiral of increasing understanding . . . without technical constraints and with no diminution in yield of unexpected and exciting new findings" (1978, p. 1120).

Despite this optimism and level of activity, there has been a growing concern among behavioral pharmacologists that behavioral analyses of drug effects have now become less prominent and that the drug and its pharmacological mechanisms of action, rather than behavior, are the predominent focus of study. The articles in this issue, together with the developments summarized above, counter this point but, still, it takes little effort to realize that, compared to the first three decades, there has been a diminishing emphasis on the *behavioral* analyses of drug action. The reasons for this are several and are unquestionably complex. Without doubt, one major factor is the increase in availability of compounds with which to work. Many of these compounds are highly specific in their actions when compared to drugs that were available only 10 years ago. When combined with advances in the identification of functionally coupled receptors that appear to act as targets for these selective compounds, research with these drugs has been and likely will continue to be extremely seductive. The increase in availability of drugs with varying degrees of specificity for behaviorally relevant receptors has also resulted in the more frequent manipulation of drugs rather than behavior. It is considerably easier to change the drug than it is to change the parameters of the variables controlling behavior; behavioral manipulations notoriously take a long time and, when answers from other disciplines appear to be coming rapidly, embarking on an experiment that may take several months to establish the behavior often seems inordinately long. The variables and contingencies that control the present and future behavior of the experimenter are as important as those used to establish the behavior under study and are worth repeated examination.

There are other factors, however, that may also be relevant. Much of the work in behavioral pharmacology has been conducted in a medical school setting where academic contingencies often differ from those of psychology departments. Perhaps more important, in the medical school setting there is less opportunity for the training of graduate students than in psychology departments, where many of the students of behavioral pharmacology were trained. The impact of this feature, coupled with the fact that most contemporary psychology departments typically are not seeking faculty interested in the experimental analysis of the behavioral effects of drugs, is likely to have an insidious and devastating effect in the future. Graduate programs and individual efforts that emphasize the study of the behavioral effects of drugs are critical to the health and viability of the field. An important part of these efforts must acknowledge the increasing sophistication required of individuals working in behavioral pharmacology. Whereas research during the initial phase of behavioral pharmacology was conducted in the context of rampant speculation about neurochemical and neurophysiological mechanisms and many individuals appropriately recoiled from such efforts, much more is now known about mechanisms of drug action and receptor pharmacology. The need for a more broadly based background to approach contemporary issues has become apparent. It is, however, important not to lose sight of the fact that behavioral variables are significant factors and that the interplay between behavior and other domains represents a continuing challenge. As the studies and efforts addressed in this issue attest, the field of behavioral pharmacology has widened and shows every promise of continued growth.

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